4REVS
CO-CREATIVE ECOSYSTEM

Case Study

Title	**3Bee: a high-tech beehive to save the bees and the beekeepers**

Main Theme (please check box "☐" below):

☒Food/agriculture/protein
☐Water
☐Resources/circular/ecosystems
☐Energy/climate/greenhouse gasses

Sub Theme	**Agri-technology, Internet of Things, artificial intelligence, machine learning, climate change, ecosystems**
Region/Country	**Europe / Italy**
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Abstract

Bees matter for several reasons: one of the most important is that three out of four crops across the globe producing fruits or seeds for human use as food depend, at least in part, on pollinators (which bees are).

Two Italian researchers, an electronic engineer and a biologist, left their previous careers to create a startup called 3Bee. The startup produces high tech instruments to control from remote the well-being of the bees inside a beehive. Then, they started an "adopt a beehive" interactive platform to sustain the work of beekeepers and the protection of the bees.

Since its foundation in 2017, they declare to have monitored 1000 beehives and 60 million of bees, which pollinated 600 million of flowers. All of this led to 302 tons of CO2 being indirectly absorbed.

They recently started a new project which aims at remote control farming animals, like pigs, to avoid the use of pesticides and better control the well-being of the animals.

Overall Description

Why do bees matter? This is the title of a recent FAO (Food and Agriculture Organization of the United Nations) document (2018), in which they report the importance of this little insect for the planet and, therefore, for human existence. Safeguarding bees means safeguarding biodiversity: most pollinators are wild, including over 20 000 species of bees. It is a fact that three out of four crops across the globe producing fruits or seeds for human use as food depend, at least in part, on pollinators. Improving pollinator density and diversity boosts crop yields because **pollinators affect 35 percent of global agricultural land**, supporting the production of 87 of the leading food crops worldwide. **Pollinators are under threat** and sustainable agriculture can reduce risk to pollinators by helping to diversify the agricultural landscape and making use of ecological processes as part of food production.

As amateur beekeepers and sustainability enthusiasts, the MIT electronic engineer Niccolò Calandri and the biologist Riccardo Balzaretti decided a few years ago to leave their careers in academic research and come back to their country – Italy – to create a startup to protect the bees. They put together their skills and knowledge and created useful **instruments for the beekeepers based on the internet of things and artificial intelligence**.

They realized different products that can be sold all together or just a few of them. Firstly, they created a scale that measures the weight of the hive, indicating how much honey there is inside. They also designed a sensor that goes inside the beehive and measures the temperature, humidity, buzz, and the speed of the wind outside the hives. The system is provided with a lithium battery that is rechargeable through a solar panel. Finally, they realized a GPS alarm to be installed inside the beehives, in case of theft. All the information coming from these instruments are sent to **an app the company programmed and that lets the beekeepers monitor their hives from remote**, limiting visits to the hives, reducing the CO2 emitted, optimizing the management of their activity and improving the quality of the bees' life.

Furthermore, **they started an adoption service using a digital platform**. People can pay different sums – all affordable – to invest in one or more years of a beehive adoption, getting jars of honey at the end of the season, getting in touch with the world of bees, ethically remunerating the beekeeper, and receiving constant updates on the bees they have 'adopted'. Thanks to this service, 3Bee appears to be **the first private company that built a database on bee mortality due to climate change and pests**, offering this activity free of charge to the network's beekeepers. They also started adoption service partnerships with companies in the food sector, such as Ferrero (the company producing Nutella), which adopted numerous beehives as part of their sustainability work.

3Bee declares that it has reinvested 100% of its profits in projects to improve the quality of life of animals through innovative techniques. This aims at expanding its service from the bees' sector to different animals farming. **They recently started a project – partly funded by the**

European Union – called "Pig Tech" to install sensors in pigs farm with the aim to monitor the health of the animals and **reduce or avoid the use of antibiotics in their breeding**.

Main Features or Highlights

- Use of artificial intelligence, Internet of Things, machine learning in agri-farming
- Monitor from remote the well-being of bees (both for beekeepers and people who adopt a beehive)
- Reduced stress in bees
- Limited trips to the beehives = less CO2
- Security system to prevent theft
- Secured income for beekeepers
- Involvement of the public in the protection of bees
- Partnership with food companies
- Exploration of the monitoring system on other farm animals

Why is this Revolutionary?

Different services in the world allow people to adopt a beehive and help protect both the bees and the work of beekeepers.

This system, though, is different because it **integrates high tech in the maintenance of the beehives:** this makes the work more efficient in terms of honey production, time, and work of the beekeepers, while at the same time protecting the bees, the environment and sustaining the economy of the sector.

Also, it is promising the work the company is doing on other animals farming because, if functioning, could allow to limit or avoid the use of antibiotics. Nowadays, 80% of all antibiotics in the world are used in intensive animal farming. The system could foster a reduction in animal farming size plants, therefore reducing one of the major CO2 emission sources in the world.

Concrete Examples

Besides the products they sell and the project for adopting a beehive, they collaborated with Ferrero (the company that produces Nutella), Parmalat (milk company), Actimel Danone and SOBI (Swedish Orphan Biovitrum, pharmaceutical company) for CRS projects.

Some example:

- Ferrero wants to involve some of its stakeholders in concrete action of sustainability. With this initiative, Ferrero intends to fund a scientific research project characterized by a high content of technological innovation in favour of bees. They supported 10 beekeepers in the region where they have their production plants.

- SOBI has contributed to the preservation of more than 300,000 beekeepers in Italy, by concretely supporting 3 Italian beekeepers.

Both on the company website and the 3Bee CEO Vimeo page there are a lot of beekeepers' videos that show how they use the instruments and are happy with them.

According to the company, they have a network of 10,000 beekeepers, with 60 million of monitored bees, 600 million of pollinated flowers and 302 tons of (indirectly) saved CO2.

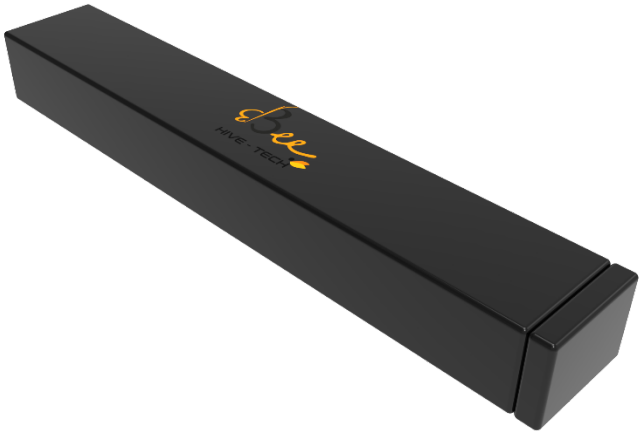
Visuals (incl. references)

Video: Presentation video (English)

Picture: Double scale for beehives

Picture: Double scale for beehives installation

Picture: battery solar charger



Picture: GPS alarm for beehives

Picture: the app to check the condition of the beehive

Picture: the EU funded project "Pig Tech"

Picture: the EU funded project "Pig Tech"

Links, related resources, people behind

Add here links for the company website, contact information for the company, sources of information and related links, etc.

Company website: https://www.3bee.it/en/

Company address:
Via Sant'Elia 12, Villa Guardia, 22079, Como, Italy

Social media
Instagram page: https://instagram.com/3beehivetech/
Facebook page: https://www.facebook.com/3Bee.eu
Twitter account: https://twitter.com/3beehivetech
Youtube channel:
https://www.youtube.com/channel/UCZnOnMm3MfgekBC17VKppag

Pig Tech page: https://www.3bee.it/pig-tech/
Pig Tech Facebook page:
https://www.facebook.com/Pig-Tech-110087287130914/